CAST STONE BY
MARCSTONE
QUALITY CRAFTSMANSHIP | SUPERIOR SERVICE

Certified WBENC Women's Business Enterprise

office 651.437.7972
fax 651.437.4821

Date: February 13, 2018

Project: New Construction of a Restroom Facility

To: Michael Huber Architects

We hereby submit for your consideration the following product as a substitute for the specified item for the above projects.

04720 Cast Stone			Manufacturer
Section Name and Number	Page #	Article, Paragraph, Subparagraph	Specified Item

Proposed Substitution: MarcStone, LLC

Attached please find standard specifications, engineering/testing reports, completed projects and references for reference.

A. Will change be required to building design or drawing dimensions in order to properly install proposed substitutions?
Yes No **x** If Yes, Explain: No Changes Required

B. Will the undersigned pay for changes to the building design, including engineering and drawing cost, caused by the requested substitutions? Yes _____ No _____ DOES NOT APPLY X

C. Differences between proposed substitution and specified item.
Equal and/or exceeds specified. High Quality and Competitive Pricing. MarcStone is not a current member of the Cast Stone Institute but complies with all standards.

D. What affect does substitution have on other trades? **N/A**

E. Does manufacturer's warranty of the proposed substitution differ from that specified? Yes____No X
If Yes, Explain _____

Submitted By: Bobbie Knealing I sales@marcstone.com I 651.437.7972

☐ Accepted ☐ Not Accepted

Approved By: Date:

Remarks:

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A summary of completed projects, pictures or color samples can be provided upon request.

STANDARD SPECIFICATION

03450 Architectural Precast | 04720 Cast Stone/Architectural Precast

This section covers architectural Cast Stone/Architectural Precast as manufactured by MarcStone, LLC. Cast Stone/Architectural Precast is a highly refined architectural concrete product manufactured to simulate natural cut stone. MarcStone, LLC is manufactured using either or both the Dry Tamp Casting Method and the Wet Casting Method.

PART 1 - GENERAL

1.1. SECTION INCLUDES - Architectural Cast Stone/Architectural Precast .

a) Scope - All labor, materials and equipment to provide the Cast Stone/Architectural Precast shown on architectural drawings and as described in this specification.
   a. Manufacturer shall furnish Cast Stone/Architectural Precast covered by this specification.
   b. Installing contractor shall unload, store, furnish all anchors, set, patch, clean and seal (optional) the Cast Stone/Architectural Precast as required.

1.2. DEFINITIONS

Cast Stone/Architectural Precast - a refined architectural concrete building unit manufactured to simulate natural cut stone, used in unit masonry applications.

a) Dry Cast Concrete Products – manufactured from zero slump concrete. Vibrant Dry Tamp (VDT) casting method: Vibratory ramming of earth moist, zero- slump concrete against a rigid mold until it is densely compacted.
b) Wet Cast Products – manufactured from the maximum 3/4" coarse aggregates and are comprised with an abundance of fine aggregates to similar to architectural precast concrete only with greater strength and minimum defects in the finished surface.

1.3. SUBMITTAL PROCEDURES

a) Comply with Section 01 33 00 – Submittal Procedures.
b) Samples: Submit pieces of the Cast Stone/Architectural Precast that are representative of the general range of finish and color proposed to be furnished for the project.
c) Test results: Submit manufacturers test results of Cast Stone/Architectural Precast previously made by the manufacturer.

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d) Shop Drawings: Submit manufacturer's shop drawings including profiles, cross sections, exposed faces, arrangement of joints, annotation of components, and their locations in project as indicated on the drawings.

1.4. QUALITY ASSURANCE

Manufacturer Qualifications:

a) Manufacturer shall have sufficient plant facilities to produce the shapes, quantities and size of Cast Stone/Architectural Precast required in accordance with the project schedule.
b) Manufacturer shall submit a written list of projects similar in scope and at least three (3) years of age, along with owner, architect and contractor references.
c) Standards: Comply with the requirements of the Cast Stone Institute.
d) Mock-up (Optional) Provide full size unit(s) for use in construction of sample wall. The approved mock-up shall become the standard for appearance and workmanship for the project.

2. PART 2 - PRODUCTS

2.1. Manufacturer

a) MarcStone, LLC PO Box 52, Hampton, MN 55031 Phone 651-437-7972 Fax 651-437-4821 E-Mail: sales@marcstone.com. www.marcstone.com

2.2. ARCHITECTURAL CAST STONE/ARCHITECTURAL PRECAST

a) Comply with ASTM C 1364
b) Physical properties: Provide the following:
c) Compressive Strength - ASTM C 1194: 6,500 psi (45 Mpa) minimum for products at 28 days.
d) Absorption - ASTM C 1195: 6% maximum by the cold water method, or 10% maximum by the boiling method for products at 28 days.
e) Air entrainment is not required for VDT products.
f) Freeze-thaw – ASTM C 1364: The CPWL shall be less than 5% after 300 cycles of freezing and thawing.
g) Linear Shrinkage – ASTM C 426: Shrinkage shall not exceed 0.065%.
h) Job site testing – One (1) sample from production units may be selected at random from the field for each 500 cubic feet (14 m 3) delivered to the job site. The cost of testing is to be born solely by the Owner.
i) Three (3) field cut cube specimens from each of these samples shall have an average minimum compressive strength of not less than 85% with no single specimen testing less than 75% of design strength is allowed by ACI 318.
j) Three (3) field cut cube specimens from each of these samples shall have an average maximum cold-water absorption of 6%.
k) Field specimens shall be tested in accordance with ASTM C 1194 and C 1195.

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2.3. RAW MATERIALS

a) Portland cement – Type I or Type III, white and/or grey, ASTM C 150.
b) Coarse aggregates - Granite, quartz or limestone, ASTM C 33, except for gradation, and are optional for the VDT casting method.
c) Fine aggregates - Manufactured or natural sands, ASTM C 33, except for gradation.
d) Colors - Inorganic iron oxide pigments, ASTM C 979 except that carbon black pigments may be used.
e) Admixtures- Comply with the following:
f) ASTM C 260 for air-entraining admixtures.
g) Other admixtures: integral water repellents and other chemicals, for which no ASTM Standard exists, shall be previously established as suitable for use in concrete by proven field performance or through laboratory testing.
h) Water – Potable
i) Reinforcing bars: ASTM A 615/A 615M. Grade 40 or 60 steel galvanized or epoxy coated when cover is less than 1.5 in. (37 mm).
j) Welded Wire Fabric: ASTM A 185 where applicable for wet cast units.
k) Anchors, dowels and other anchoring devices and shims shall be standard building stone anchors commercially available in a non-corrosive material such as zinc plated, galvanized steel, brass, fiberglass or stainless steel. Anchoring to be provided and installed by others, unless noted otherwise. Anchors or embeds that are of a non-corrosive material that become modified during installation (welded) need to field touched up (painted-see Div 9900 specs) to bring back to non-corrosive state by installing contractor.

2.3. COLOR AND FINISH

Specifier note: choose one of the following:

a) Simulate sample on file in architect's office (specify brick / stone/ color type color and manufacturer).
b) MarcStone standard colors provided with shop drawings, unless custom color match required.
    a. All surfaces intended to be exposed to view shall have a fine-grained texture similar to natural stone, with no air voids in excess of 1/32 in. (0.8 mm) and the density of such voids shall be less than 3 occurrences per any 1 in.^{2} (25 mm^2) and not obvious under direct daylight illumination at a 20 ft (1.5m) distance.
    b. Units shall exhibit a texture approximately equal to the approved sample when viewed under direct daylight illumination at a 20 ft (3 m) distance.
    c. ASTM D 2244 permissible variation in color between units of comparable age subjected to similar weathering exposure.
    d. Total color difference – not greater than 6 units.
    e. Total hue difference – not greater than 2 units.
    f. Minor chipping resulting from shipment and delivery is not grounds for rejection. Minor chips shall not be obvious under direct daylight illumination from a 20-ft (6 m) distance.

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g. The occurrence of crazing or efflorescence shall not constitute a cause for rejection.
h. Remove cement film, if required, from exposed surfaces prior to packaging for shipment.

2.4. REINFORCING

a) The building code allows concrete members to be designed as 'plain' concrete. Un-reinforced concrete is defined as 'plain' concrete. The building code allows 'plain' concrete to be designed using a tensile stress of 5 x sq. root of F'c. For 4000 psi concrete (well below minimum 6,500 psi as required by this spec), this is equivalent to an allowable tensile stress of 316 psi. Since there is no reinforcing steel required for the maximum design loads, the minimum reinforcing steel is controlled by the shrinkage and temperature of the concrete. The minimum steel is calculated using .0020 x the cross section area. Since this is considerably less than the 316 psi allowable, most Cast Stone/Architectural Precast pieces do not require any reinforcing for the flexural bending stresses once the panels are permanently in place. The largest stress to most Cast Stone/Architectural Precast pieces will likely be during casting and handling.
b) Reinforcement for units that are four (4') feet or longer or as indicated by the drawings may need reinforcement for safe handling only.
c) Reinforcement shall be noncorrosive where faces exposed to weather are covered with less than 1.5 in. (38 mm) of concrete material. All reinforcement shall have minimum coverage of twice the diameter of the bars.
d) Panels, soffits and similar stones greater than 24 in. (600 mm) in one direction shall be reinforced in that direction. Units less than 24 in. (600 mm) in both their length and width dimension shall be non-reinforced unless otherwise specified.

2.5. CURING

a) Cure units in a warm curing chamber approximately 50°F-100°F (37.8°C) at 95 percent relative humidity for approximately 12 hours, or cure in a 95 percent moist environment at a minimum 50°F for 16 hours after casting. Additional yard curing at 50°F (10°C) or 5 days @ 70°F (21°C)) prior to shipping.

2.6. MANUFACTURING TOLERANCES

a) Cross section dimensions shall not deviate by more than 1/8 in. (3 mm) from approved dimensions.
b) Length of units shall not deviate by more than length1/4 in.
c) Maximum length of any unit shall not exceed 15 times the average thickness of such unit unless otherwise agreed by the manufacturer.
d) Warp, bow or twist of units shall not exceed length1/8 in.
e) Location of dowel holes, anchor slots, flashing grooves, false joints and similar features – On formed sides of unit, 1/4 in. (3 mm), on unformed sides of unit, 3/8 in. to 1 in. maximum deviation.

2.7. PRODUCTION QUALITY CONTROL

a) Test compressive strength and absorption from specimens selected at random from plant production.
b) Samples shall be taken and tested from every 500 (14 m^3) cubic feet of product produced.
c) Perform tests in accordance ASTM C 1194 and C 1195.
d) New and existing mix designs shall be tested for strength and absorption compliance prior to producing units.

2.8. DELIVERY, STORAGE AND HANDLING

a) Mark production units with the identification marks as shown on the shop drawings.
b) Package units and protect them from staining or damage during shipping and storage.
c) Provide an itemized list of product to support the bill of lading.

3. PART 3 EXECUTION

3.1. EXAMINATION

a) Installing contractor shall check Cast Stone/Architectural Precast materials for fit and finish prior to installation. Do not set unacceptable units. Notify Architect if construction is not acceptable. Do not begin installation until unacceptable conditions have been corrected. Installation denotes acceptance.

3.2. SETTING TOLERANCES

a) Installation Tolerances: Comply with requirements of Cast Stone/Architectural Precast Institute Technical Manual.
b) Variation from Plumb: Do not exceed 1/8 inch in 5 feet (3 mm in 1.5 m) or 1/4 inch in 20 feet (6 mm in 6 m) or more.
c) Variation from Level: Do not exceed 1/8 inch in 5 feet (3 mm in 1.5 m), 1/4 inch in 20 feet (6 mm in 6 m), or 3/8 inch (9 mm) maximum.
d) Variation in Joint Width: Do not vary joint thickness more than 1/8 inch (3 mm) or 1/4 of nominal joint width, whichever is greater.
e) Variation in Plane Between Adjacent Surfaces: Do not exceed 1/8-inch (3-mm) difference between planes of adjacent components or adjacent surfaces indicated to be flush with components.

3.3. JOINTING

a) Joint size:
b) At stone/brick joints 3/8 in. (9.5 cm).
c) At stone/stone joints in vertical position 1/4 in. (6 mm) (3/8 in. (9.5 mm) optional).
d) Stone/stone joints exposed on top 3/8 in. (9.5 mm).
e) Joint materials:

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f) Mortar, Type N, ASTM C 270.
g) Use a full bed of mortar at all bed joints.
h) Flush vertical joints full with mortar.
i) Leave all joints with exposed tops or under relieving angles open for sealant.
j) Leave head joints in copings and projecting components open for sealant.
k) Location of joints:
    a. As shown on shop drawings.
    b. At control and expansion joints unless otherwise shown.

3.4. SETTING

a) Drench Cast Stone/Architectural Precast components with clear, running water immediately before installation.
b) Do not use pry bars or other equipment in a manner that could damage Cast Stone/Architectural Precast components.
c) Fill dowel holes and anchor slots completely with mortar or non-shrink grout.
d) Set Cast Stone/Architectural Precast components in a full bed of mortar, unless otherwise indicated on the drawings.
e) Fill vertical joints with mortar.
f) Make joints 3/8 inch (9 mm), unless otherwise indicated on the drawings.
g) Leave head joints in copings and similar components open for sealant.
h) Tuck point joints to a slight concave profile.

3.5. JOINT PROTECTION

a) Comply with requirements of Section 07 90 00.
b) Prime ends of units, insert properly sized backing rod and install required sealant.

3.6. REPAIR AND CLEANING

a) Repair chips with touchup materials furnished by manufacturer, upon order. Touch up procedure is to be by an approved method.
b) Saturate units to be cleaned prior to applying an approved masonry cleaner.
c) Consult with manufacturer for appropriate cleaners.

3.7. INSPECTION AND ACCEPTANCE

a) Inspect finished installation according to previous standards.
b) Do not field apply water repellant until repair, cleaning, inspection and acceptance is completed.

END OF SECTION

AMERICAN ENGINEERING TESTING, INC.

CONSULTANTS
• ENVIRONMENTAL
• GEOTECHNICAL
• MATERIALS
• FORENSICS

REPORT OF ARCHITECTURAL CAST STONE UNIT TESTING, ASTM C1364-16 Standard Specifications for Architectural Cast Stone

PROJECT:
PRODUCTION CHECK
HAMTON, MINNESOTA

REPORTED TO:
MARCSTONE
P.O. BOX 52
HAMPTON, MN 55031

ATTN: ELYCE DOFFING

AET PR0JECT NO: 20-15214

DATE: March 3, 2017

Product Type: Cast Stone Sample: Mix Design S
Date: Manufactured: January 27, 2017, Tested: March 1, 2017

Sample:	A	B	C	Avg	ASTM Spec C1364-16 3 Unit Avg
Physical Properties					
Absorption, (Method A) %:	3.4	2.7	3.1	3.1	**6 Max**
Strength					
Total Load, lbs:	32,510	28,650	30,370		
Gross Area, sq in:	3.99	3.97	3.99		
Gross Strength, psi:	8,150	7,220	7,610	7,660	6,500 Min

Remarks:
The samples meet ASTM:C1364-16b specifications for Architectural Cast Stone.

Report Prepared By:

John J. Haupt, PE, LEED AP
Senior Engineer